HECTOR J. RIBERA (221511)
hector@martonribera.com
RYAN J. MARTON (223979)
ryan@martonribera.com
CAROLYN CHANG (217933)
carolyn@martonribera.com
MARTON RIBERA SCHUMANN & CHANG LLP
548 Market Street, Suite 36117
San Francisco, CA 94104
Tel.: (415) 360-2511

Attorney for Plaintiff SEMICAPS Pte Ltd.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SEMICAPS PTE LTD.

Plaintiff,

v.

HAMAMATSU PHONTOICS K.K., HAMAMATSU CORPORATION, and PHOTONICS MANAGEMENT CORP.,

Defendants.

Case No: 3:17-cv-3440-DMR

SEMICAPS PTE LTD.'S OPPOSITION TO DEFENDANTS' MOTION TO DISMISS

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Plaintiff SEMICAPS Pte Ltd. ("Plaintiff" or "SEMICAPS") submits the following Opposition to Defendants' Hamamatsu Photonics K.K., Hamamatsu Corporation, and Photonics Management System (collectively, "Defendants" or "Hamamatsu") Motion to Dismiss.

I. Introduction

SEMICAPS is the owner of U.S. Patent No. 7,623,982 (the '982 patent), titled "Method of Testing an Electronic Circuit and Apparatus Thereof." SEMICAPS alleges that Defendants infringe claims 4-8, 17 and 21-25 of the '982 patent based on Hamamatsu's Failure Analysis systems equipped with pulsed lasers and configured to perform laser-induced fault detection testing using SEMICAP's patented technology.

SEMICAPS first approached Hamamatsu in May 2014 with respect to its infringement of the '982 patent. *See* Dkt. 1-4. After years of discussions, unable to reach a resolution with Hamamatsu, SEMICAPS filed this suit in June 2017. In response, Hamamatsu filed two *Inter Partes* Reviews (IPRs) in the U.S. Patent and Trademark Office seeking to invalidate all the claims of the '982 patent. Dkt. 27 at 3. SEMICAPS did not oppose Hamamatsu's motion to stay this litigation agreeing that "any invalidity issues shall be resolved in the IPR before proceeding with costly district court litigation." *Id*. at 4. The U.S. Patent Office instituted the two IPRs and ultimately "determined that Hamamatsu had not established by a preponderance of the evidence that the challenged claims of the '982 patent were unpatentable." Dkt. 44 at 2. Having failed at the Patent Office, Hamamatsu, by its current motion, takes another shot at avoiding its liability for infringing SEMICAPS' patent, alleging now that it claims non-patentable abstract ideas. But like before, Hamamatsu's challenge to the '982 patent is flawed.

Notably, Hamamatsu's assertion that the '982 patent is directed to the "the abstract idea of accumulating data and using it generate a test result" is inconsistent with how its own expert characterized the patent in the IPR proceedings. In the IPRs, Hamamatsu's expert acknowledged that the '982 patent is directed to a "method for testing an electronic circuit" and, specifically, to a method for an alleged "improvement in the detection sensitivity" in "laser induced [testing] techniques." Marton Declaration in Support of Opposition to Motion to Dismiss ("Marton Decl."), ¶ 3, Ex. A, pp.

8-9. Referring to Figure 1 in the '982 patent, Hamamatsu's expert described the system disclosed in the patent as follows:

> [A]n apparatus including a laser beam source 103, which can be any suitable laser beam source (such as "an infrared laser source, an ultraviolet laser source, an X-Ray laser source, a gas laser source, a chemical laser source or a solid state laser source, for example"). The laser beam can be a continuous beam or a pulsed beam. A measuring circuit 107 is used to obtain sample measurements of the response signal of the electronic circuit 111 to the stimulus of the laser beam. The measuring circuit 107 measures the response signal, which can be an electrical voltage, an electrical current, or a combination of the two. A signal processor 109 then processes the sample measurements of the response signal of the electronic circuit 111 under test by accumulating the plurality of samples to generate a value, and to then generate a test result based on the value generated. The apparatus can either include a display unit or can be connected to an external display unit.

Id. (Ex. A at 9). Hamamatsu's expert never contended that the '982 patent claims are directed to the general notion of gathering data with general purpose computing technology. In light of this, Hamamatsu's new assertion that the '982 patent is directed to merely an abstract idea defies credibility.

Indeed, as Hamamatsu's own expert's description of the '982 patent reflects, the '982 patent is far from a claim to an abstract idea. Instead, it is directed to a specific machine for testing integrated circuits. Specifically, the invention of the '982 patent is directed to a new system for laser-based-fault detection in integrated circuits wherein a laser radiates a particular location of an integrated circuit during which time a plurality of samples of a response signal are measured. The measurement samples at each location are digitally processed and converted to a value that is used to pinpoint the presence and severity of a fault at the tested location of the electronic circuit. The novel approach provided by the '982 patent significantly improves fault detection sensitivity in laser-based testing systems.

The specific system claimed in the '982 patent is exactly the type of invention that is patent eligible. *McRO, Inc. v. Bandai Namco Games Am. Inc*., 837 F.3d 1299, 1313 (Fed. Cir. 2016) (recognizing that claims directed to "a specific means or method that improves … technology" are patent eligible); *Trading Techs. Int'l, Inc. v. CQG, Inc*., 675 F. App'x 1001, 1005 (Fed. Cir. 2017)

(non-precedential) ("Abstraction is avoided or overcome when a proposed new application or computer-implemented function is not simply the generalized use of a computer as a tool to conduct a known or obvious process, but instead is an improvement to the capability of the system as a whole."). Notably, while Hamamatsu now alleges that the '982 patent is directed to "conventional techniques that were already known in the prior art," in the two IPRs it filed, Hamamatsu was unable to find a single prior patent or publication that discloses or teaches the allegedly "conventional" invention claimed by the '982 patent.

Hamamatsu's entire motion depends on a gross oversimplification of the patent that disregards the technical context of the patent as whole and ignores "the concrete, palpable, tangible limitations of the invention the patentee actually claims." *CLS Bank Int'l v. Alice Corp. Pty. Ltd.*, 717 F.3d 1269, 1298 (Fed. Cir. 2013), aff'd, 573 U.S. 208 (2014). Hamamatsu's reductionist characterization elides the technological advances claimed by the '982 patent, is antithetical to the Section 101 analysis, and has been expressly cautioned against by the Supreme Court noting that, "[a]t some level, 'all inventions … embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" *Alice Corp. Pty. Ltd. v. CLS Bank International*, 573 U.S. 208, 217 (2014) (*quoting Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012)). Heeding this warning and looking at the patent and claims as whole, it is indisputable that the '982 patent claims are directed to an improved laser-based fault localization system as opposed to being directed to an activity for which a computer is invoked as tool (*e.g.* collecting data using a general purpose technology). As such, the '982 patent claims are eligible under Section 101.

II. The '982 Patent

As noted above, the '982 patent relates to laser-based testing of integrated circuits to determine the location of defects on the semiconductor circuit. To understand the invention claimed by the '982 patent it is useful to understand the technical context of the patent. After integrated circuits are fabricated, they are typically tested by connecting them to electronic test equipment that applies test signals to each integrated circuit and receives output signals from the circuit as a result. If the output signals do not match the expected output signals, *i.e.*, the device does not operate as intended, then the circuit is determined to have a defect. However, using this method, it is not

possible to localize the defect, *i.e.* to know where in the integrated circuit the defect is located. This is problematic because knowing what structures are causing defects allows designers and process engineers to fix the problem so that the defect does not occur in that location in future fabrication runs. Thus, to determine the location of the problem or fault, failure analysis systems are used to perform fault localization testing. One approach for performing this type of testing relies on the use of laser beams.

In this type of testing, a laser is used to irradiate locations on an electronic circuit or chip while a constant voltage or current source is also connected to the circuit. An increase in resistivity of the integrated circuit due to an increase in temperature caused by the irradiated laser is detected as current or voltage variation and can be used to identify the location of circuit faults. Examples of these testing include Optical Beam Induced Resistance Change ("OBIRCH") or Thermally Induced Voltage Alteration ("TIVA") testing. However, the current or voltage variation induced by laser radiation using these techniques is very small, susceptive to electrical noise in the circuits, and can be difficult to measure. The '982 patent is directed to improving the detection sensitivity of laser-based testing systems to detect these very small signal variations when using laser-based fault localization techniques such as OBIRCH and TIVA. '982 Patent at 9:37-57. The inventors of the '982 patent recognized that prior art systems lacked the detection sensitivity necessary to measure the laser-induced current or voltage variations on newer, more advanced integrated circuits. *Id.* at 1:28-37. The inventors explained that:

> … with the advancement of integrated circuit technology which has typically involved the use of more metallization layers and new low k inter-layer dielectric materials with lower thermal conductivity, the laser coupling efficiency is reduced. As a result, the detection sensitivity of these conventional laser induced techniques is also reduced. Accordingly, in order for these conventional laser induced techniques to remain effective, especially when used for the more advanced integrated circuits, an improvement in their detection sensitivity is needed.

Id.

Prior attempts to increase the sensitivity of these laser-based testing systems presented other difficulties. For example, increasing the power of the laser "in order to compensate for the reduced laser coupling efficiency" was problematic because "there may be potential laser induced damage on

the integrated circuit under test when the power of the laser beam used is too high." *Id*. at 1:41-45. Another approach was to use pulsed lasers that would not damage the circuit or overheat surrounding circuit locations but to be able to detect the pulsed-laser induced signals, a lock-in amplifier was required. *Id.* at 1:50-56. However, successful use of a lock-in amplifier depended upon "accurate calibration and fine control of the lock-in amplifier parameters, such as the time constant, lock-in frequency, and the phase difference between the reference frequency and the frequency of pulsing the laser beam for each scanning speed used." *Id.* at 1:57-62. This required calibration and control is "difficult to achieve in practice," and "therefore, is not used in a real-time integrated circuit testing environment." *Id.* at 62-67.

The inventors of the '982 patent developed a system to greatly increase detection sensitivity in a laser test system without using these difficult-to-use lock-in amplifiers. *Id*. at 10:23-30. The '982 patent describes using a pulsed laser and signal processing technique that provides an order of magnitude (i.e. 10 times) improvement in detection sensitivity as shown in Fig. 8. *Id.* at 9:37-57. As described in the '982 patent, "[w]hen a laser is radiated on the location of a fault on the electronic circuit, the electronic circuit at the location of the fault will be stimulated, and the response signal can be measured." *Id.* at 6:7-11. The laser apparatus is directed to dwell on a particular location and then is directed to move to a second location, moving across the integrated circuit until the laser apparatus has radiated all locations. *Id.* at 4:29-57.

In the '982 patent the laser is directed to deliver a number of pulses of radiation at each given location. *Id*. at 8:51-9:19; 9:1-2 ("N is the number of pulses of laser beam radiated onto each pixel location"). While the laser is pulsing a particular location, the measurement circuit takes a plurality of measurements of the response signal that results from the multiple excitations by the pulsing laser. *Id.* at 6:25-29, Fig. 5. The response signal is sampled (digitally measured) at a rate that is five-to-ten times faster than the laser pulse frequency. *Id.* at 8:5-7. Instead of using the prior lock-in amplifier approach, the system of the '982 patent digitally accumulates (mathematically processes) the multiple samples determined at each location of the integrated circuit; the accumulated samples are converted to a value that represents the brightness of a pixel on a display showing the integrated circuit. *Id.* at 8:14-24. The brightness of the pixel represents the presence and severity of a fault, and the pixel's

location is the location of the fault on the integrated circuit. *Id.* Figure 9 illustrates a displayed fault. *Id.* at 9:58-60.

An important aspect of the '982 patent is determining of multiple samples or measurements of the response signals induced by the laser pulses at each location under testing before moving on to the next location and the accumulation of the multiple measurements. While these response signals may be very small, that is, the small variations in voltage or current induced by the resistance change caused by the pulsing laser light heating the circuit elements, taking multiple samples and accumulating them amplifies the overall result, allowing the system to detect very small signal changes. The '982 patent also provides specific instructions on how often to pulse the laser to avoid overheating or damaging the circuit while being able to produce response signals that can be measured. The patent explains that the "duration that the laser beam dwells on the first location … or dwell time," should be controlled to "allow the measuring circuit 107 and the signal processor 109 have sufficient time to obtain and process at least two samples of the response signal at the said location, before the laser beam is moved to the next location of the electronic circuit." *Id*. at 4:50-58. These novel signal processing techniques described are included in the independent claims in the following exemplary limitations:

> *determining a plurality of samples of a response signal output by the electronic circuit during the period when the laser beam is radiated,*
>
> *accumulating the plurality of samples to generate a value, and generating a test result based on the value.*

Id. at 10:62-67. These claimed features were found by the Patent Office to distinguish the '982 patent from the prior art. Indeed, these claimed features were confirmed to be novel by the Patent Trial and Appeal Board ("PTAB") in the two separate *IPR* proceedings initiated by Hamamatsu. Marton Decl., ¶ 4-5.

For example, the main reference Hamamatsu relied upon in its IPR petitions, Hamada, "disclose[d] a method and device for inspection of a semiconductor device by irradiating it with an optical beam and measuring the resistance change in the circuit to determine a defective portion of the circuit." Marton Decl. ¶ 4, Ex. B at p. 13. However, the laser-based testing approach of Hamada did not use the multiple-sampling approach of the asserted claims; the PTAB found that Hamamatsu

"failed to establish … that Hamada discloses 'determining a plurality of samples of a response signal output by the electronic circuit during the period when the laser beam is radiated,' as recited in independent claim 1, or 'a measuring circuit, wherein the measuring circuit determines a plurality of samples of a response signal output by the electronic circuit during the period when the laser beam is radiated,' as recited in independent claim 21." *Id*., Ex. B at p. 28. The PTAB also found that Hamamatsu "failed to establish by a preponderance of evidence that Hamada discloses 'accumulating the plurality of samples to generate a value,' as recited in independent claim 1, or 'a signal processor, wherein the signal processor accumulates the plurality of samples to generate a value,' as recited in independent claim 21." *Id*., Ex. B at p. 29.

As shown by the table in Figure 8, the new technique described and claimed in the '982 patent increases detection sensitivity by an order of magnitude over prior art methods. '982 Patent at 9:37-41. Additionally, it achieves this higher sensitivity without the use of a lock-in amplifier as required by prior art solutions and therefore overcoming the difficulty of use in real-time production test environments. *Id.* at 10:23-30. The invention is, as such, a new and novel system that operates in a unique way to solve a technical problem.

III. Legal Standard

When patent eligibility is challenged in a motion to dismiss, courts "must apply the well-settled Rule 12(b)(6) standard, which is consistently applied in every area of law": The motion "must be denied if 'in the light most favorable to the plaintiff and with every doubt resolved in the pleader's favor … the complaint states any legally cognizable claim for relief.'" *Aatrix Software, Inc. v. Green Shades Software, Inc*., 890 F.3d 1354, 1357 (Fed. Cir. 2018) (Moore, J., concurring in denial of rehearing *en banc*) (quoting 5B Charles Alan Wright & Arthur R. Miller, Federal Practice and Procedure § 1357 (3d ed. 2018)).

To determine whether a patent claims ineligible subject matter under 35 U.S.C. § 101, courts employ the two-part test set out in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 573 U.S. 208 (2014). Issued patents are presumed valid under 35 U.S.C. § 282, so defendants raising a § 101 challenge must prove all facts "pertinent to the invalidity conclusion … by clear and convincing evidence." *Berkheimer v. HP Inc*., 881 F.3d 1360, 1368 (Fed. Cir. 2018).

At the first step, the challenger must show that the claim as a whole is "directed to a patent-ineligible concept" such as an abstract idea. *Alice*, 573 U.S. at 218. A claim that provides "a specific means or method that improves the relevant technology" is not an abstract idea under *Alice's* step one. *McRO*, 837 F.3d at 1314. Even claims for computer-based inventions that provide "an improvement to the capability of the system as a whole" are not abstract ideas. *Trading Techs. Int'l, Inc. v. CQG, Inc.*, 675 F. App'x 1001, 1005 (Fed. Cir. 2017) (non-precedential). Where a claimed invention "achieve[s] an improved technological result in conventional industry practice," it is not abstract, and the court need not reach step two. *McRO*, 837 F.3d at 1316.

Even a claim reciting an abstract idea can be patent eligible under *Alice's* second step "when the claim limitations involve more than performance of well-understood, routine, and conventional activities previously known to the industry." *Berkheimer*, 881 F.3d at 1367 (quoting *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014)) (internal quotation and modification marks omitted). "Whether a particular technology is well-understood, routine, and conventional goes beyond what was simply known in the prior art." *Id.* at 1369. Although the ultimate question of patent eligibility is one of law, "whether a claim element or combination of elements would have been well-understood, routine, and conventional to a skilled artisan in the relevant field at a particular point in time is a question of fact." *Aatrix*, 890 F.3d at 1355; *Berkheimer*, 881 F.3d at 1368. At the 12(b)(6) stage, such factual questions generally "cannot be answered adversely to the patentee based on the sources properly considered on a motion to dismiss, such as the complaint, the patent, and materials subject to judicial notice." *Aatrix,* 882 F.3d at 1128.

IV. Argument

A. Step One: The Asserted Claims are Not Directed to An Abstract Idea

The asserted claims (here 4-8, 17 and 21-25) are directed to a patentable system for fault detection testing of integrated circuits. Contrary to Hamamatsu's allegations, these claims are not directed to using a conventional computer or other conventional technological components as a tool for implementing "the abstract idea of accumulating data and using it generate a test result." Mot., at p. 12. Rather, it is indisputable that the claims are directed to an improved system for laser-based

fault localization in integrated circuits.

Independent claim 21 is a good example. It is directed to an apparatus that has a "laser beam source" that "radiates a laser beam" onto a an "electronic circuit." I t has a "control system" that "direct[s] the laser beam source to dwell on a location on the electronic circuit." It has a "measuring circuit" that "determines a plurality of samples of a response signal output by the electronic circuit during the period that when the laser beam is irradiated." And it has a "signal processor" that "accumulates the plurality of samples to generate a value" and related test result. This claim, like all claims in the '982 patent, is directed to a specific solution, in this case a system configured to operate in a specific way – radiating a pulsed laser on a location in an electronic circuit, measuring the response signal with multiple samples at each location before moving on to next location and accumulating the multiple samples to generate a test result that identifies the location of faults in the electronic circuit. This approach solves a technological problem arising in laser based integrated circuit fault localization: namely the need for increased fault detection sensitivity. This specific system is the antithesis of abstract.

Hamamatsu argues that the asserted claims are directed to "the abstract idea of accumulating data and using it generate a test result." Mot. at 12. This characterization oversimplifies the claims, fails to capture the patent's key innovation, and ignores the claimed technical context. Hamamatsu's oversimplification of the claims ignores that the express purpose of the claim is "testing an electronic circuit." *See e.g.*, '982 Patent at claim 1. The claims are not about gathering data with a general purpose computer system (or some other type of conventional technology) but are instead tied to a specific machine used in a very specific field. Asserting that the claims are directed to gathering data, abstracts them beyond any fair reading of the claims.[1]

[1] To the extent that Hamamatsu contends that the "determining" and "accumulation" steps in the claims constitute nothing more than gathering or collecting information, Hamamatsu is grossly misconstruing those claim elements. As described above, the determining step is in fact a process by which the response signal is measured and the accumulation step is a process by which the measured samples are mathematically processed to create a test result. If there is a dispute about the scope of these claim terms (as there appears to be) – then the Section 101 determination is inappropriate at this early stage of the proceedings. *Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can.,* 687 F.3d 1266, 1273 (Fed. Cir. 2012) (explaining that the eligibility analysis "requires a full understanding of

As noted above, the Supreme Court has cautioned against exactly this sort of reductive analysis, noting that, "[a]t some level, 'all inventions … embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" *Alice*, 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 71). In other words, every claimed invention can be described at a high enough level of generality that it appears to be nothing more than an abstract idea or law of nature. Thus, courts must be careful to "articulate what the claims are directed to with enough specificity to ensure the step one inquiry is meaningful." *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1347 (Fed. Cir. 2017); *McRO*, 837 F.3d at 1313 ("[C]ourts must be careful to avoid oversimplifying the claims by looking at them generally and failing to account for the specific requirements of the claims.") (citations omitted). Hamamatsu's argument violates this important cannon of the step one inquiry. Its oversimplification of the claims of the '982 patent ignores, for example, limitations requiring a laser, a measuring circuit, and a specific way of measuring and processing "response signals."

There are no cases finding a patent directed to a system for testing integrated circuits to be an abstract idea. To the contrary, the '982 patent is like those found in the seminal Federal Circuit cases wherein the "focus of the claims is on the specific asserted improvement" of technology. *See Enfish LLC v. Microsoft Corp*., 822 F.3d 1327, 1335-36 (Fed. Cir. 2016). In *Enfish*, the Federal Circuit analyzed the specification and found that it described the benefits of using the claimed self-referential table—faster searching and more effective data storage—as compared with a conventional database structure. *Id*. at 1333, 1337. Because the claims were directed to this improvement in the computer's functionality, the Federal Circuit found that they were patent-eligible under *Alice* step one. *Id*. at 1336. Similarly, in *Thales* the Federal Circuit analyzed the specification and claims and concluded that though the invention involved conventional mathematics, the claims were directed to a "new and useful technique for using sensors to more efficiently track an object on a moving platform" and not generically to the mathematical equation "required to complete the claimed method." *Thales*, 850 F.3d at 1349. In *DDR*, the Federal Circuit emphasized that the claims were directed to more than an abstract idea that merely required a "computer network operating in its normal, expected manner."

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the basic character of the claimed subject matter" and that courts therefore find it "desirable— and often necessary—to resolve claim construction disputes prior to a § 101 analysis").

DDR Holdings, LLC v.Hotels.com, L.P., 773 F.3d 1245, 1255 (Fed. Cir. 2014). Because the claims solved the technological problem of "conventional Internet hyperlink protocol preventing websites from retaining visitors," they were not abstract. *Id*. at 1259; *see also, BASCOM Global Internet Services, Inc. v. AT&T Mobility LLC*, 827 F.3d 1341 (Fed. Cir. 2016) (upholding claims directed to an improved method of filtering content); *Amdocs (Israel) Ltd. v. Openet Telecom, Inc*., 841 F.3d 1288 (Fed. Cir. 2016) (upholding claims that solved the technological problem of "massive data flows requiring huge databases"). Like the patents in *Enfish*, *Thales*, *BASCOM*, *DDR* and *Amdocs*, the '982 patent is directed to a specific system that offers a technological solution to a technological problem: testing electronic circuits with laser-based fault detection systems to find the location of faults with improved sensitivity, allowing detection of smaller variations in current or voltage even in more advanced electronic circuits (with more metallization layers and new low k inter-layer dielectric materials with lower thermal conductivity), and without the need of lock-in amplifiers– and not a broad idea of "accumulating data" implemented on a general purpose computer as Hamamatsu alleges.

Hamamatsu's reliance on *Electric Power Group* and *TLI* is misplaced. In *Electric Power Group*, the only advance that patent purported to make was "a process of gathering and analyzing information of a specified content, then displaying the results." *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016). The patent there was not directed to "any assertedly inventive technology for performing those functions." *Id*. By contrast, the '982 patent, as explained above, is directed to a new system for testing integrated circuits that enables the measurement of weaker laser-induced response signals than could be measured with prior approaches, particularly in the face of newer electronic circuits having more metallization layers and new low k inter-layer dielectric materials with lower thermal conductivity, which made the prior approaches ineffective.

In *TLI*, the patent at issue "relate[d] generally to an apparatus for recording of a digital image, communicating the digital image from the recording device to a storage device, and to administering the digital image in the storage device." *In re TLI Commc'ns LLC Patent Litig*., 823 F.3d 607, 609 (Fed. Cir. 2016). The Federal Circuit found that because the patent was described "in terms of generic computer functions" and did not describe any new way for technology to operate the claims

were "not directed to a 'technological problem'" and, thus, were ineligible. *Id*. at 613. The '982 patent, on the other hand, is directed to a technological problem: improving fault detection sensitivity in laser-based testing of integrated circuits. And the '982 patent describes and claims a specific solution- namely measuring a plurality of response signals while a pulsed laser irradiates a particular location on a circuit and "accumulating" (*i.e.* mathematically processing) those measurements to create a test result. While laser-based fault detection testing was not new, the specific approach claimed in the '982 patent was a new approach (all the claims of the '982 patent were found patentable in the two IPRs Hamamatsu filed) that resulted in an improvement in fault detection sensitivity in laser-based failure analysis systems. *See* '982 Patent, fig. 8.

Notably, the '982 patent does not raise preemption concerns. Rather, it claims the use of specific integrated circuit testing technique with an exceptionally limited preemptive footprint that, when applied, "achieve[s] an improved technological result" in the way faults in integrated circuits are localized using laser-induced testing techniques, such as OBIRCH or TIVA. *See McRO*, 837 F.3d at 1316. Many other ways of performing OBIRCH or TIVA testing are available but they suffer from the sensitivity deficiencies the invention solves. In this way, the asserted claims are "necessarily rooted in [laser-based fault detection] technology," and "overcome a problem specifically arising in the realm of [laser-based failure analysis systems]"—the precise kind of technological invention that the Federal Circuit has repeatedly determined to be patent-eligible. *See DDR Holdings,* 773 F.3d at 1257; *see also Enfish*, 822 F.3d at 1336; *Visual Memory LLC v. NVIDIA Corp*., 867 F.3d 1253, 1259-60 (Fed. Cir. 2017).

It is also notable that the '982 patent even satisfies the "machine or transformation" test. *See Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can.,* 687 F.3d 1266, 1278 (Fed. Cir. 2012) (holding that the machine-or-transformation test remains an important clue in determining whether some inventions are processes under § 101). Under this test a claim is patent eligible if "(1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing." *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008) (en banc), aff'd on other grounds, *Bilski*, 561 U.S. 593, 130 S.Ct. 3218. Here, the '982 patent is tied to a particular machine, laser-based failure analysis systems, that operate in the specific way required by the claims.

For all the above reasons, the claims of the '982 patent are directed to "a new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof" as required by 35 U.S.C. § 101 and meet the requirements of step one in *Alice*. These claims are not directed to an abstract idea. No further analysis is required for the Court to find that the asserted claims recite patentable subject matter.

B. Step Two: The '982 Patent Claims an Inventive Concept

Although proceeding to the *Alice* step two is not required because the '982 patent claims recite patent eligible technological inventions, Hamamatsu's motion also fails with respect to step two. Step two of the *Alice* framework involves identifying the "inventive concept" and determining whether it is "sufficient to transform the nature of the claim into a patent eligible application." *McRO, Inc.*, 837 F.3d at 1312 (citing *Alice*, 134 S. Ct. at 2355) (quotations omitted). This step entails looking at the elements of the claim and the claim as a whole "to determine whether the claims contain an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.'" *Id*. (citing *Mayo*, 132 S. Ct. at 1294) (quotations omitted).

Because it is clear that the claims of the '982 patent are directed to a specific laser-based fault detection system and its operation in a specific way, the analysis required in step two is hard to apply to the claims at hand. For example, the way the court in *Network Congestion* phrased the question posed by step two illustrates how it is inapposite to the subject matter of the asserted claims: the Court is supposed to determine "whether the claims merely recite the performance of some business practice known from the pre-Internet world along with the requirement to perform it on the Internet, or whether the claims are directed to a problem specifically arising in the realm of computer technology and the claimed solution specifies how computer technology should be manipulated to overcome the problem." *Network Congestion Solutions, LLC v. U.S. Cellular Corp.,* 170 F. Supp. 3d 695, 699 (D. Del. 2016) (citing *DDR Holdings, LLC*, 773 F.3d at 1257) (quotations omitted).

As explained above, the '982 patent is an unconventional solution to a technological problem in the field—namely need for increased fault detection sensitivity in laser-based testing of modern, more complex, integrated circuits. The '982 patent "solve[s] that problem in a particular, technical

way" by determining multiple samples of a response signal while a laser pulses radiate a particular location on an integrated circuit, mathematically processing those measurements and creating a test result. *Bascom Global Internet Serv., Inc.* at 1350-51. This "particular arrangement of elements" yields a "technical improvement over prior art technologies." *Amdocs*, 841 F.3d at 1302. And that improvement is not merely the "improved speed or efficiency inherent with applying the abstract idea on a computer." *Intellectual Ventures I LLC v. Symantec Corp*., 838 F.3d 1307, 1316 (Fed. Cir. 2016). For example, in the system described in the '982 patent, "[t]he signal processor 109 may be implemented on a digital signal processor or a programmable processor, e.g., a microprocessor including complex instruction set computer (CISC) processor or reduced instruction set computer (RISC) processor, for example." The mere use of those processors does not result in the sensitivity improvement. Instead, like the claims in *DDR Holdings*, the improvement relates to the very functioning of the underlying testing methodology. 773 F.3d at 1258. For example, unlike the system described in the Hamada system (relied upon by Hamamatsu in its IPRs), the system in the '982 patent determines multiple samples of the response signal and accumulates them to generate a result. Through this novel approach, the '982 patent increases detection sensitivity by an order of magnitude over prior art methods. '982 Patent at 9:37-41. Additionally, the approach described and claimed in the '982 patent achieves this higher sensitivity without the use of a lock-in amplifier as required by other prior art solutions and therefore overcoming the difficulty of use in real-time production test environments. *Id.* at 10:23-30. This constitutes an inventive concept. *Amdocs* at 1300-01 (finding inventive "generic components . . . operate in an unconventional manner to achieve an improvement in computer functionality.").

Hamamatsu's argument that "'982 patent recite computer and hardware components like a laser beam source, control system, measuring circuit, and signal processor is not enough to provide an inventive concept" (Mot. At 16) misses the point. The '982 patent is not directed to these technologies operating in their normal manner, like for example they did in the Hamada system. Instead, the '982 patent is directed to a new way for these components to function – namely determining a plurality of samples of the response signal induced in the integrated circuit while a pulsed laser irradiates a location on the integrated circuit, accumulating the samples, and using

accumulated samples to create a test result. This is new inventive approach to laser-based testing that no other prior art system performed. Indeed, there is no evidence that these components, operating in such a way, are conventional or known; to the contrary, the PTAB determined they are not. Marton Decl. ¶¶ 4-5. Moreover, Hamamatsu's assertion that these components are "known" is irrelevant. Whether something was ***known*** at the time of the invention is not the inquiry here. The question is whether it was "well-known" or "conventional" knowledge. *See Mayo*, 132 S. Ct. at 1292 ("well-understood, routine, conventional activity"). Hamamatsu has no evidence, much less "clear and convincing evidence," that the claimed combination of components was well known or conventional; not only are they not, but under the lower "preponderance of the evidence standard" applicable in IPR proceedings, the PTAB found that Hamamatsu was unable to come forth with a single prior art patent or publication that disclosed SEMICAPS' novel approach.

V. Conclusion

Hamamatsu has failed to carry its burden to establish that the '982 patent is ineligible for patent protection. The Court should deny the motion.

Dated: June 6, 2019 Respectfully submitted,

MARTON RIBERA SCHUMANN & CHANG LLP

By: /s/ *Ryan J. Marton*
Ryan J. Marton

RYAN J. MARTON (SBN 223979)
ryan@martonribera.com
MARTON RIBERA SCHUMANN & CHANG LLP
548 Market Street, Suite 36117
San Francisco, CA 94104
Telephone: (415) 360-2515

CERTIFICATE OF SERVICE

I hereby certify that on June 6, 2019, I caused to be electronically filed the foregoing with the Clerk of the Court via CM/ECF. Notice of this filing will be sent by email to all parties by operation of the Court's electronic filing systems.

Dated: June 6, 2019

By: /s/ *Ryan J. Marton*
Ryan J. Marton